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NEW AND LITTLE KNOWN PHALLOSTETHIDS, WITH KEYS TO THE GENERA AND PHILIPPINE SPECIES

By Albert W. C. T. Herre

The tiny and almost invisible fishes known as Phallostethidae are in some spects the most remarkable of all living fishes. They form the suborder Phallo-sthoidea, of the order Percesoces, equal to the suborders Mugiloidea and Poly-noidea. All species are much alike in general form and structure, being slender, rongly compressed laterally, colorless and more or less translucent in life. eir lack of color and small size have enabled most species to escape observation, d thus remain unknown.

The body is covered with cycloid scales, usually regularly arranged; the ad and nape are naked, or variously scaled; a thin dermal keel is always present the abdomen, its height and extent varying with the species. The anal and gona-openings are in the throat. The head is small; the mouth strongly oblique, or arly vertical, with prominent chin. The jaws are equal, or the lower one slightly cluded; both jaws protractile. The minute, hooked teeth are in one to several ws. The very large eye is high up, flush with, or impinging on, the dorsal pro-le; the flat interorbital space is nearly equal to, or greater than, the eye ameter.

The first dorsal fin is very far back, of one or two spines, or may be ab-nt. The second dorsal begins two to four scales behind the first, and is of one two spines, and four to nine rays; its origin is over or behind the last anal r. The anal is of one or two spines and 10 to 28 rays. The pointed, narrow pec-ral is high up. The caudal is more or less deeply forked.

The sexes are strongly dimorphic. The males present the strange spectacle of nes growing on the outside of an asymmetrical organ peculiar to the group, the priapium, an elaborate muscular and osseus copulatory organ which lies on the under ide of the head and throat. Its complex bony internal skeleton is manifested ex-rnally in long, curved bones, used for clasping the female as the male fertilizes e eggs. The toxactinium, found in two genera, each with a single known species, bjects from the anterior end of the priapium. On the base of the toxactinium, d tapering forward to the anterior end of the priapium, is a mass of fibrous ssue, which Regan named the pulvinulus. Nearly all species have a mass of par-nchymatous cartilage on the middle part of the lower surface of the priapium, ich Regan named the pulvinular appendage, because in *Neostethus lankesteri* it was appendage of the pulvinulus. It is the "Priapbug" of Aurich, the "pulvinulus" most authors. From the aproctal side of the posterior end of the priapium pro-ct one or two ctenactinia; in addition, a short, sharp-pointed, and more or less

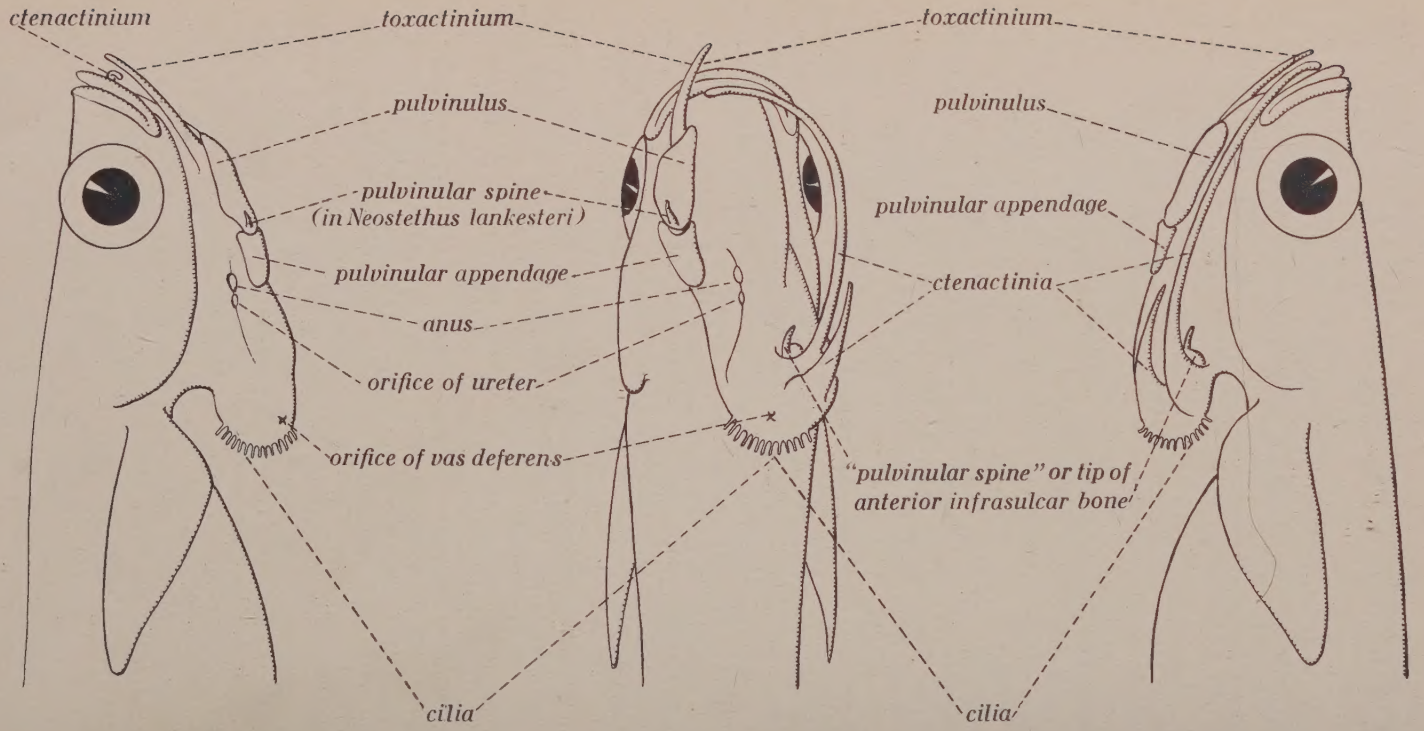

Fig. 1. Composite diagrams of head and priapium of an imaginary male Phallostethid, to show terminology used in text. The position, shape, and presence or absence of the parts illustrated will vary with the species. Compiled from the literature by Margaret Storey; redrawn by G. F. Ferris.

ked spine, the free tip of the anterior infrasulcar bone, may also be present, ially beside a ctenactinium. Authors refer to this as the "pulvinular spine." The led, enlarged vas deferens lies within the posterior end of the priapium, from ch its penis-like tip projects. The proctal side may be either side, so that es of the same species may be either "rights" or "lefts."

Females may have a groove in which the openings of the anus, ureter, and duct lie, along the median ventral line, beneath the head and throat or pectoral e; or there may be no groove. The genital opening often lies in a papilla, or is rounded by a pair of papillae. These papillae, or similar structures, represent rtigial ventrals, as shown by the development of rayed ventrals in the young of h sexes. After a little while, the ventrals disappear.

In spite of their strong family resemblances, the 18 species of PhallostedS thus far known present marked divergencies. In a previous paper I recoged 10 genera. Further study has shown that the generic differences are greater n were recognized at that time. When one considers the geographical distribution Phallostethids, and the trenchant differences existent between many, it is evit that there are a number of species yet to be discovered. Arranged by habitat, llostethids fall into three groups. First to be discovered, most numerous in cies, and most widespread, are those of brackish and salt water. They are known abound in Malaya, Singapore, Siam, Borneo, and the Philippines. Next are those mountain brooks and rivers, thus far known only from Luzon. Scarcely separable one or two species from lowland fresh-water creeks, occurring in Siam and Lu. Lastly are the species occurring in fresh-water lakes. These are known from two large Philippine islands of Luzon and Mindanao, and from the small island Wé, which lies off the western tip of Sumatra. It is therefore evident that itional species of these singular little fishes are to be expected from the stal areas and fresh-water lakes and streams of the East Indies from Sumatra to ebes, from Indo-China, and from other parts of the Philippines,

Owing to their small size, lack of color, and translucency in life, most llostethids are totally unknown to the people of the regions where they occur. arently only three species are large enough or abundant enough to be used as d, and then only where good food fish are difficult to obtain much of the time.

In general, all Phallostethids occur in small schools, swimming at or very r the surface. Their eyes, and a gleam of color in the peritoneum, are the only ible evidence of their presence, and it requires trained and acute vision to see n. When much disturbed, the schools break up, and the individuals escape by ing on the bottom. Brackish and salt water species advance up tidal creeks in at numbers, with the incoming tide. They keep close to the bank, taking advane of the vegetation for shelter, and of eddies and backwaters; are borne far up eam by the tide, and even enter fresh water. As the tide goes out they return to et sheltered lagoons, bays, and estuaries, or take refuge in mangrove and nipa ps, or in pools left by the receding tide. These species spawn in mangrove and swamps, and at low tide incredible swarms of young may be seen in favorable s, well shaded by the jungle. In areas where the water is from one to a few es deep at low tide, and filled with erect finger-like aerial roots from the rove trees, as well as with larger roots running over the bottom, and with all litter of a dense tropical forest, these tiny fishes have a maximum of food and ection. At a hint of danger they lie on the bottom, hidden in the debris, and ected from the wiles of the fish collector by the myriads of aerial roots. species of mountain streams stay out of the strong currents, living mainly in es and backwaters, where they can obtain a maximum of insect food. Lake dwellforms live along shore or in quiet bays, where they are protected by vegeta-

In preservative, the fishes lose their translucency, and series of melan phores become more or less evident. Some species even develop characteristic mark In general, there is a fine black line, or series of dots, along the middle of t side; the dorsal scales are more or less margined by black dots; and other dots dashes are along the anal base. Often the top of the head, and the surface of t priapium, are more or less dotted or smudged with black.

The Phallostethid skeleton has been exhaustively treated by Bailey, and t priapial skeleton and general structure by Regan and by Aurich. The biology a embryology have been carefully studied by Manacop, and by Villadolid and Manaco while the author has discussed the habits of *Neostethus borneensis*.

Phallostethus, with one species, is known only from the original collecti from Johore. *Phenacostethus*, with one species, abounds in the canals of Bangko Siam. These two genera are given in the generic key below, but discussion of t two species is omitted. All other known species are treated in this paper.

The types of the new species proposed are in the Natural History Museum Stanford University. All lengths given by me are standard length; presumably tho given by Aurich and Regan are the standard length also. Measurements were made wi an adjustable micrometer, graduated to tenths of a millimeter; and all scale a fin counts were made with the aid of a compound microscope.

KEY TO THE GENERA OF PHALLOSTETHIDAE

1a. A toxactinium present, with a shield-like pulvinulus over its base; one ctenactinium present:
2a. Anal fin with 26-28 rays; ctenactinium serrated; jaws equal, or lower slightly included; abdomen of female grooved; no first dorsal fin (?)..... *Phallostethu*
2b. Anal fin with 14-15 rays; ctenactinium not serrated; lower jaw projecting; no groove on abdomen of female; first dorsal fin of one spine..... *Phenacostethu*
1b. Toxactinium absent; pulvinulus small or absent, its appendage variously shaped or absent; one or two ctenactinia present:
3a. No first dorsal fin; nape and opercles scaled, or naked; two ctenactinia, one very short:
4a. Nape and opercles scaled; anal I,13 to 15; no pulvinulus or appendage visible, the latter replaced by a thin strip of tender skin..... *Mirophallu*
4b. Nape and opercles naked; anal II,17 to 21; an oval pulvinular appendage, its margin free..... *Solenophallu*
3b. First dorsal fin of one or two spines; one or two ctenactinia present; nape and opercles naked (some species of *Neostethus* with two, or three, opercular scales):
5a. Two ctenactinia present; no comb-like cilia on hind end of priapium:
6a. No pulvinulus or pulvinular appendage visible; one ctenactinium long, slender, curved, the other shorter, stouter, with expanded hooked tip; mountain brook fishes with stout body..... *Gulaphallu*
6b. Pulvinulus reduced, its appendage visible as an oval plate with depressed center on aproctal side of priapium, its posterior half more or less free, its margin almost wholly

free; both ctenactinia long; a small fringe of coarse cilia sometimes present on tissue between "neck" and priapium, concealed by rounded end of latter; brackish-water fishes, very slender, with strongly marked "neck"..... *Ceratostethus.*

b. A single long ctenactinium on adult male; comb-like cilia present or absent on hind end of priapium:

7a. Ctenactinium strongly curved, slender, a narrow membranous margin absent, or sometimes present; no flat, many-spined process on infrasulcar prominence:

8a. Female with curved, bony, sharp spine behind anal opening, and below pectoral base; male without visible pulvinulus or pulvinular appendage; no comb of cilia on rear of priapium..... *Manacopus.*

8b. Female with no pointed, bony spine on "breast"; male with oval pulvinular appendage, its margin free, or nearly so, its posterior pointed tip more or less free; priapium with a fringe of comb-like cilia on rear:

9a. No open fringed groove on priapium; preopercle naked, or with two, or three, large scales..... *Neostethus.*

9b. Priapium with an open groove, densely fringed along both margins; preopercle naked..... *Ctenophallus.*

7b. Ctenactinium little curved, a broad membranous margin along lower side proximal half; infrasulcar prominence with a large, flat, fleshy process, bearing nine or 10 short, recurved spines on upper hind border, and two longer, forward-pointing spines on front edge; no fringe on rear of priapium..... *Plectrostethus.*

MIROPHALLUS Herre

ophallus Herre, 1926, Philippine Journ. Sci., vol. 31, p. 539.

This is one of two Phallostethids thus far known without a trace of a first rsal. There is likewise no toxactinium, no pulvinulus, and no pulvinular append-e, the place of the latter being taken by a thin strip of tender skin. The nape scaled up to the interorbital space, and there are a number of scales on the ercles. Males have two ctenactinia, the larger extending forward to the mouth, l curving over to the side opposite its origin, which is on one side of the hind l of the priapium. At one side of its expanded base is the short, curved second enactinium. The smooth, rounded rump of the priapium has no comb or fringe as in *stethus*. Females have a broad, thickened ridge along the mid-ventral line under throat; in the anterior half lies the anal opening, and a little back of the ddle lies the larger genital opening. The minute teeth are in bands. The caudal but little forked. Vertebrae 33.

As yet this genus is represented by but one species, found only in Camarines and Albay Provinces, Luzon, Philippine Islands.

Mirophallus bikolanus Herre

Mirophallus bikolanus Herre, 1926, Philippine Journ. Sci., vol. 31, p. 540, pl

First dorsal fin absent; dorsal I,6 or 5; anal I,13 to 15 (usually pectoral I,12; 31 to 34 scales in a longitudinal series, 7 transverse, 23 t predorsal scales; gill-rakers 2+12.

In shape, color, and general appearance, this species is much like mos the other members of the family. In females, the depth is 4.6 to 5, head 4. 4.5 in the length. The large, circular eye is very high up, lateral, 2.5 to 2. head, and a little more than, up to half again as much, as the length of the sn Three rows of teeth in upper jaw, four in the lower; the lower band divided two parts by a toothless space at the middle. The elongate, narrow caudal is little forked, or may be nearly truncate, 3 to 4.6 in standard length. Males s derer than females, depth 4.9 to 5.2 in length; head 5.5 to 5.7. Eye 2.2 to in head; snout 1.2 to 1.8 in eye. Males do not differ from females in the o measurements.

I have studied only the original collection of 28 females, 15 to 24 m length, and 22 males, 16 to 24 mm in length, from Lake Bato, Camarines Sur Pr ince, Luzon. With the exception of three paratypes now in the Stanford Natu History Museum (Stanford 24475), the above specimens, with others collected af ward, were in the Philippine Bureau of Fisheries collection in Manila when came. Owing to the poor condition of the three Stanford specimens, and the los most of the scales, I cannot count the opercular scales, but they apparently from six to nine. There is an abdominal keel, as in other Phallostethids, but three specimens available show only the merest trace of one.

SOLENOPHALLUS Aurich

Solenophallus Aurich, 1937, Internat. Rev. Hydrobiol. u. Hydrogr., vol. 34, p. 2

No toxactinium, and no first dorsal. The long, bow-shaped ctenactinium e beneath the chin. In the curve of its base projects the short, hook-like tip of anterior infrasulcar bone, or pulvinular spine, like a tiny ctenactinium. At forward end of the priapium is a small, oval pulvinular appendage ("Priapbug its margin free; behind it is the narrow and inconspicuous pulvinulus. The round free posterior end of the priapium bears a fringe of cilia. Males have a very p nounced "neck," due to the growth of the priapium. The cycloid scales are irre larly arranged, 32 to 34 in a lateral series, 10 to 11 in a transverse series the origin of the dorsal; predorsal scales 25 to 30, very irregularly arranged. nape is naked, but the opercles are scaled, not naked as given by Aurich. The a fin is of moderate length.

Only one species is known, confined to Lake Mainit, a large body of fr water in Surigao Province, at the northeast corner of Mindanao, Philippine Islan

Solenophallus thessa Aurich

enophallus thessa Aurich, 1937, Internat. Rev. Hydrobiol. u. Hydrogr., vol. 34, . 264, fig. 1a.

No first dorsal. Dorsal I,7 to 9; anal II, 17 to 21; pectoral I,11 or 12; les in longitudinal series 32 to 34, 10 to 11 transverse, predorsal scales 25 to The scales are very deciduous, and none of my specimens have more than a scat- ed few left; but I was fortunate enough to have several females with two or more les left on their opercles. In life the number of opercular scales is not less n four, and may be five or six. Gill-rakers 2+16.

Adult females have the depth 5.0 to 5.15, head 4.6 to 5.15 in length; eye to 3.25 in head. Adult males have the depth 5.75 to 6.6, head 5.3 to 5.6 in gth; eye 3.12 to 3.4 in head. The deeply forked caudal is longer than head, and to 5.7 in the standard length.

This is the second largest and bulkiest Phallostethid known, and is used for d by the people around Lake Mainit. Only *Gulaphallus eximius* exceeds it in bulk length.

I have examined 32 females, 21 to 31 mm, and 21 males, 19 to 30 mm long anford 36546). At 21 mm, males are only beginning their priapial development.

GULAPHALLUS Herre

laphallus Herre, 1925, Philippine Journ. Sci., vol. 27, p. 508.

Males have two ctenactinia; one is long, slender, rod-like, and curved, the ier is shorter, stouter, with an expanded and hooked tip. There is no toxactin- n, and no pulvinulus or pulvinular appendage.

First dorsal II; second dorsal I,6 or 7; anal II, or I,14 to 17; pectoral 3; scales in longitudinal series 32 to 58; transverse scales 9 to 14; predorsal ales 24 to 30.

Two species are known from mountain streams of Luzon. These streams are bject to great variations in volume and speed of current. As far as possible, ese fishes remain in shaded, deep, and relatively quiet places, taking advantage eddies and back currents along shore to prevent being carried away. They feed inly on small insects and insect larvae.

Genotype *Gulaphallus eximius* Herre.

KEY TO THE SPECIES

ales in lateral series 56 to 58..... *Gulaphallus eximius.*
ales in lateral series 32 to 38..... *Gulaphallus mirabilis.*

Gulaphallus eximius Herre

Gulaphallus eximius Herre, 1925, Philippine Journ. Sci., vol. 27, p. 509, pl. pl. 2, figs. 1,2.

First dorsal II; second dorsal I,6; anal II,14 to 16; pectoral I,8; scal in lateral series 56 to 58; predorsal scales 28 to 30; scales from origin of seco dorsal to point directly below 14; from origin second dorsal to origin anal first dorsal is in fifth scale before origin of second dorsal.

This species, the bulkiest of the Phallostethids, attains a length of 41 m It is thus far only known from the Magat River and its tributaries, Nueva Vizca Province, Luzon, Philippine Islands, at an altitude of about 1000 to 1200 fee During the rainy season, when the water is muddy, it is caught in quantity by t people along the river, and used for food. When the water is clear, during the d season, the fishes see the net, and only a few individuals can be taken.

At a point on the Magat River several kilometers north of Santa Fé, I o tained 40 females, 20 to 37 mm, 35 males, 20 to 34 mm, and eight of indetermina sex, 12 to 19 mm in standard length (Stanford 24474).

Gulaphallus mirabilis Herre

Gulaphallus mirabilis Herre, 1925, Philippine Journ. Sci., vol. 27, p. 511, pl. figs. 3-5; Villadolid and Manacop, 1934, ibid., vol. 55, p. 195, pls. 2-5.

This species is the best known of all the Phallostethidae, thanks to t excellent work by Villadolid and Manacop on the embryology, breeding habits, a food of this little fish. Due to their studies, carried on for over a year, we n know its entire life history from egg to maturity.

First dorsal II; second dorsal I,6 or 7; anal II, or I,14 to 17; pector I,8; scales in lateral series 32 to 38, plus one or two on the caudal base; scal in transverse series 9; predorsal scales 24 to 26; first dorsal is three scal before the second dorsal, rarely four. Gill-rakers 1+12 or 13.

This species occurs in hill streams all around the central plain of Luzo and in the tributaries of Laguna de Bay, Philippine Islands. I collected it firs from the Ibo, a creek flowing into the Angat River, Bulacan Province. Later, D Villadolid found it to be abundant in the Molawin, a small creek flowing throu the campus of the College of Agriculture, Laguna Province, and emptying into Lagu de Bay. I also collected it from small streams near Fort Stotsenberg, Pampang Province. Five females, 19 to 24 mm, and three males, 21 to 22 mm in length, wer taken from Olo Creek, Mangatarem, Pangasinan Province; six females and a male, to 31 mm in length, were obtained at Sison, Pangasinan Province. From the Molawi in addition to numerous specimens previously collected, I have 41 females, 17 t 27 mm, and 32 males, 15 to 30 mm in length; two others, 15 and 16 mm in length, a probably females. From the Santa Maria River, Santa Maria, Laguna Province, 4 specimens, from 13 to 31 mm in length, were taken. Apparently, 31 mm is the maxi mum size for this species.

Males sometimes start the development of the priapium when only 15 mm long but it is usually not evident until a length of 18 to 20 mm is reached. As in othe species of Phallostethidae, some males may have the priapium and its accessorie fully developed when others, even larger, may have only the slightest rudiment

ident. Males may be completely mature at 21 mm, while others of the same length y not have the ctenactinia more than barely perceptible.

CERATOSTETHUS Myers

ratostethus Myers, 1937, Proc. U.S. Nat. Mus., vol. 84, p. 138.

Two long ctenactinia present. Pulvinular appendage plainly evident on aproc- l side of priapium as an oval prominence with a depressed center. No comb-like inge on free end of priapium, but three or more long cilia form a sort of fringe one side of the priapium, or projecting from the membrane connecting priapium d "neck." The body is slender and elongate, with a very slender "neck" on males.

Only one species is known, from brackish waters of Malaya, Singapore Island, d Palawan, Philippine Islands. Genotype *Neostethus bicornis* Regan.

Ceratostethus bicornis (Regan)

ostethus bicornis Regan, 1916, Proc. Zool. Soc. London, p. 14, fig. 11.
ratostethus bicornis Myers, 1937, Proc. U.S. Nat. Mus., vol. 84, p. 141.

First dorsal I (II in Philippine specimens, according to Myers); second rsal I,4 or 5; anal II,12 to 14; pectoral I,10; scales in a longitudinal series to 36, plus one or two small ones on caudal base; predorsal scales 18 to 22; rst dorsal two or three scales in advance of second dorsal; transverse scales 6.

Depth of males 6 to 6.66, head 5.6 to 6.66, caudal 4 to 4.2 in length; eye 87 to 3.12 in head. Dorsal and anal rays are much longer than in other members the family. Depth of females 5.85 to 6.4, head 4.8 to 4.9 in length. Caudal and e are as in males. The keel is very well developed in this species. In adult les the longer ctenactinium curves like a bow to below the eye, then across be- nd the chin, with its pointed tip in front of the other eye; the second ctenac- nium is about half as long, more angularly bowed, with a sharp-hooked tip. Only mmature specimens have enlarged tips to the ctenactinia, as shown in Regan's fig- e. Females have more of a "neck" than any other female Phallostethids known to . I have nothing to add to Myers' account of the female characters. On one or o specimens could be seen the minute spines he mentioned, but most specimens d not show them.

From puddles of brackish water left after high tide floods the swamp drained the Kranji River, Singapore Island, I collected 12 females, 20 to 25 mm, and 43 les, 15.5 to 28.5 mm long (Stanford 35783). Males 22 mm long, and some even of mm, had little priapial development, and none at all of the ctenactinia. Many of or 20 mm could only be placed as males by the strongly marked "neck." Evidently rge and fully developed females were able to escape capture by dip net. It is obable that this species attains a length of at least 30 mm.

Regan had two males, 21 and 25 mm long, one immature and one nearly adult, d a female of 24 mm, taken from brackish water at Kuala Langat, Johore. Myers d for study the following specimens in the U.S. National Museum: eight adults om Singapore Island; and seven adults from the west coast of Palawan, Philippine slands, of which six were taken from Nakoda Bay, and one from the Malampaya River.

MANACOPUS Herre

Acanthostethus Herre, 1939, Proc. Biol. Soc. Washington, vol. 52, p. 142 (preoccupied).
Manacopus Herre, 1940, Copeia, July 28, p. 141.

The females of this genus are notable by the presence of a large, curved, sharp-pointed, bony papilla in the median ventral line, a little behind the anal opening, and below the pectoral base; this papilla arches back over the openings of the oviduct and ureter. The males have a priapium different from that of other Phallostethids. The strongly curved tip of the single bow-shaped ctenactinium rests in a groove between the chin and the front end of the priapium; as in some other Phallostethids, this groove often closes at the top, the ctenactinium then projecting through the tissue. Between the ctenactinial base and priapium projects the short, sharp pulvinular spine. Covering the anterior infrasulcar bone and region next the ctenactinium, and more or less concealing the pulvinular spine, is a thin, rounded flap of dermal tissue, half to two-thirds the size of the eye, and attached only by its aproctal edge. This flap covers the part marked "pulvinulus" in Manacop's figure, and is a structure unlike anything found on any other known Phallostethid. The pulvinulus and pulvinular appendage are reduced to a narrow strip of skin, only the pointed posterior tip of the latter being free.

The head and nape are naked. Two dorsals are present, and the anal is of moderate length. The minute, pointed teeth are in two rows in each jaw. An abdominal keel is present. The scalation, fins, and general body form conform to the usual Phallostethid plan.

Only one species is known. It occurs in fresh-water streams and gurami ponds of Pampanga and Nueva Ecija Provinces, Luzon, in the region about Mount Arayat.

Genotype *Gulaphallus falcifer* Manacop.

Manacopus falcifer (Manacop)

Gulaphallus falcifer Manacop, 1936, Philippine Journ. Sci., vol. 59, p. 375, 2 pls.
Acanthostethus falcifer Herre, 1939, Proc. Biol. Soc. Washington, vol. 52, p. 142.
Manacopus falcifer Herre, 1940, Copeia, July 28, p. 141.

First dorsal I or II; second dorsal I,6; anal II,14 or 15; pectoral I,8 or 9; scales 30 to 32 in longitudinal and 7 in transverse series; predorsal scales 14 to 16; either two or three scales between the first and second dorsal.

Females have the depth 4.3 to 4.7, head 4.16 to 5, caudal 4.33 to 4.8 in length; eye 2.5 to 2.9 in head. Males have the depth 5 to 5.3, head 5.2 to 5.75, caudal 4.33 in length; eye 2.6 to 2.7 in head.

This remarkable species is one of the most strongly marked of the Phallostethids. The large and conspicuous hook-like spine on the breast of the deep-bodied female has no counterpart among other Phallostethids, and the male is equally distinctive and unique. Their characteristic form alone would enable either to be recognized at sight; but, in addition, unlike other Phallostethids, preserved specimens of both sexes have a distinctive and striking color-mark, a conspicuous black spot on the abdomen, just in front of the anal fin. Other color-marks are those common to all Phallostethids, but are fainter.

The head is small, with blunt snout and projecting chin, the mouth nearly

tical. The moderately incised caudal is equal to or a little longer than the d. There are no comb-like cilia on the free rounded hind end of the priapium. atdominal keel is much broader and more evident in its posterior portion, the erior half being little developed.

I have examined 19 females, 18 to 26 mm, and 22 males, 23 to 26 mm long, lected from a gurami pond near Mexico, Pampanga Province, Luzon, Philippine ands (Stanford 32356). This is one of the larger Phallostethids, being bulkier n the majority of species, when specimens of equal length are compared.

NEOSTETHUS Regan

ostethus Regan, 1916, Proc. Zool. Soc. London, p. 2.

This genus contains small to very small, elongate, slender, and strongly mpressed fishes of brackish and salt water; though some species may enter fr sh ter. The head is small, short, with a terminal, protractile, and strongly oblique uth, with one or two rows of conical teeth in the jaws.

First dorsal I or II; second dorsal I, or II,4 to 6; anal II,10 to 15; pec- ral I,8 to 11; scales, longitudinal 25 to 37, predorsal 15 to 24. The head and pe may be naked, or the nape scaled to the eyes, and there may be two, or three, rge opercular scales.

The ventrals may be represented by a pair of papillae in the young of some ecies. In others a thick ring forms about the anus, then divides posteriorly, and stigial rays develop, after which the ventrals disappear. The males of some spe- es develop a pair of minute ventrals in which several rays can be seen with a croscope; the structures lengthen and thicken and the rays disappear, while the riapium begins to develop where they were.

Adult males have the priapium fastened to the underside of the head and roat, and a "neck" is more or less evident behind it. On the rounded free end of ie priapium is a fringe of comb-like cilia, which is sometimes very little evi- ent. A single long, slender, and strongly curved ctenactinium is attached to ei- ner the right or left side of the priapium; in some species there is a membranous old or margin along one side of it. In addition, the anterior infrasulcar bone is ore or less conspicuous by the exposure of its tip, which authors call the pul- inular spine. In some species, this spine projects some distance from the priap- m, and may be variously curved or angled, as if it were a miniature second cten- ctinium. The pulvinular appendage is oval, with a pointed and more or less free osterior tip, while its entire margin is free, or nearly so. A glandular length- ise groove on the aproctal side of the upper part of the priapium continues behind nto an efferent groove.

In females the openings of the anus and oviduct are in the median ventral ine, below the pectoral base; one species also has a spur or papilla on each side, ust below the pectoral base. Both sexes have a cutaneous, rayless abdominal keel.

There is considerable individual variation in the depth of body, and degree f sexual development of fishes of the same length in a given species. All the pecies of the genus have about the same amount of variation in bodily proportions, nd they all agree very closely in transparency and color markings. In all, the cau- al is deeply forked, the pectoral long and narrow, and the fins similarly shaped. easurements and color notes have therefore been largely omitted from the descrip- ions, as they would be mainly a repetition.

In life, these tiny fishes are colorless and almost invisible; the pale

golden sheen of the eyes and peritoneum are the only visible indication of their presence. It requires trained and acute vision to detect them in the water. When placed in preservative, the eyes become black, and series of melanophores become visible. The species vary somewhat in the development of pigment, but in general there is a black line, or row of black dashes, from the upper angle of the opercle to the middle of the caudal base; a row of black dots, or a black line, along the anal base, which joins its fellow on the underside of the caudal peduncle, and continues to the caudal; in some species there is also a black line on the base of the abdominal keel. The dorsal scales are margined by black or brown dots, and often there are heavy black dots all along the middle of the back, with a black or brown spot on the crown of the head, and the whole top of the head heavily dotted or blackened; the sides of the head, the pectoral base, and its axil, are more or less heavily dotted with reddish brown or black. Males have the projecting part of the priapium, and females the underside of the head, dotted or spotted. The fins are all colorless.

The members of this genus occur in great abundance in brackish and salt water, sometimes entering the mouths of fresh-water streamlets, from Luzon throughout the Philippines, along the coast of Borneo, to Singapore, Malaya, and Siam. They are probably widespread in the East Indies, and may be expected in Indo-China. One species is known from Malaya, one from Siam, one from Borneo, and five from the Philippines.

Genotype *Neostethus lankesteri* Regan.

KEY TO THE SPECIES OF *NEOSTETHUS*

1a. No scales on opercles (subgenus *Neostethus*):
 2a. Female with two spurs or papillae on sides of throat; first dorsal II or I; anal I, or II,12 to 16; longitudinal scale series 28 to 32..... *amaricola.*
 2b. No spurs or papillae on throat of female:
  3a. First dorsal I; longitudinal scale series 34 to 36..... *lankesteri.*
  3b. First dorsal II; longitudinal scale series 30 to 32:
   4a. Second dorsal I,5; anal I,15..... *siamensis.*
   4b. Second dorsal I,4; anal II,12 to 14..... *villadolidi.*
1b. Two or three scales on each opercle (subgenus *Sandakanus*):
 5a. Three scales on opercle..... *borneensis.*
 5b. Two scales on opercle:
  6a. Anal I, or II,10 to 12; longitudinal scale series 25 to 27; predorsal scales 16 to 18; gill-rakers 1+10 or 11..... *coronensis.*
  6b. Anal II,12 to 13:
   7a. Nape scaled to just behind eyes; anal II,12 or 13; longitudinal scale series 28 to 30; predorsal scales 19 to 23: gill-rakers 2+15..... *panayensis.*
   7b. Nape naked, scales not extending on head; anal II,13 to 15; longitudinal scale series 29 to 32; predorsal scales 16 or 17 (19); gill-rakers 1+12..... *zamboangae.*

Neostethus amaricola (Villadolid and Manacop)

laphallus amaricola Villadolid and Manacop, 1934, Philippine Journ. Sci., vol. 55, p. 194.

First dorsal II or I; second dorsal I, or II,4 or 5, usually I,4; anal I, or I,12 to 16, usually II,14; pectoral I,8 (also 9?); scales in lateral series 30 to 2 (rarely 28?), plus two on caudal base; predorsal scales 17 to 22, usually 17 o 19; transverse scales 5 from origin of second dorsal to posterior end of anal; irst dorsal arises at front border of third scale before second dorsal. Females ave a spur or papilla on each side of throat, below pectoral base.

The scales of this fish are so deciduous that those on the nape are rarely vident. Villadolid and Manacop say "head, nape, and opercle naked," but scales ctually extend forward to the back of the head, ending in a larger scale, though hey are seldom seen. An examination of 155 specimens showed a few with all the cales intact, while a number of others showed scale-pockets, with one or two ter- inal scales still attached. The teeth are in two rows in each jaw.

Approximately 1000 specimens, nine to 22 mm long, were taken from salt water t the Dagat-dagatan Fisheries Experiment Station at Navotas, a few miles north of anila. One hundred fifty-five specimens, 10 to 23 mm long, were taken from a swamp f brackish water at Hacienda Waterous, Mangarin, Mindoro. Females were adult and ull of eggs at 18 mm, and males may be fully developed at the same length, or a ittle more. The greatest length attained is 25 mm.

This species was originally taken from a tidal slough near Fort San Antonio le Abad, Manila; in 1940 this was filled in, and the area converted to a park. his fish is one of the most widespread of the Phallostethids. It is very common round Manila Bay, and has been recorded from the northeastern tip of Luzon to ort Dupon, Leyte, P. I.

Neostethus lankesteri Regan

Neostethus lankesteri Regan, 1916, Proc. Zool. Soc. London, p. 2, figs. 1-10, pls. 1-4; Weber and de Beaufort, 1922, Fishes Indo-Austr. Archipel., vol. 4, p. 382, fig. 103.

First dorsal I; second dorsal I,4 or 5; anal II,13 or 14; pectoral I,9 or 10; scales in longitudinal series 34 to 36. Depth 4.7, head 4.1 in length; eye 3 in head. Origin of second dorsal above last anal ray. Pectoral shorter than head. There is a single long, slender ctenactinium, which curves backward and upward, then forward below eye, and finally downward and across beneath the chin.

Only the six original British Museum specimens, five adult males and one adult female, are known, all about 30 mm "in total length." They were collected from brackish water in the Muar River, Johore, and the Island of Singapore. After Regan.

Until more material is available, the limits of the genus must be vague, and the relationships of the forms placed under *Neostethus* will remain uncertain. Some of them may not be more than geographical races of *N. lankesteri*.

Neostethus siamensis Myers

Neostethus siamensis Myers, 1937, Proc. U.S. Nat. Mus., vol. 84, p. 139.

First dorsal II; second dorsal I,5; anal I,15, pectoral I,11; scales in lateral series 31; transverse scales at deepest part of body 7; nape naked. Depth 4.55, head 5.2 in length. According to Myers, *N. siamensis* is deeper than *N. lankesteri*, and has the dorsal and anal fins placed farther back.

Only known from a single female specimen, taken by Dr. Hugh M. Smith, in the estuary of the Chantabun River, southeastern Siam. Possibly an extensive series of specimens would show this species to be identical with *N. lankesteri*.

Neostethus villadolidi, new species

First dorsal II; second dorsal I,4; anal II,12 to 14; pectoral I,8; scales in lateral series 30 to 32; predorsal scales 18 to 20; scales in transverse series 6; first dorsal arises from third scale before second dorsal. Gill-rakers 2+15.

Females 23 mm long have the depth 5.75 to 5.9, head 4.6 to 5.1 in length; eye 2.8 to 3.3 in head. Males 22 to 23 mm long have the depth 5.5 to 6.25, head 4.88 to 5 in length; eye 2.8 to 3 in head. Caudal deeply lunate, with elongate tips, 4.1 to 4.2 in length for females, 3.45 to 3.66 for males.

Dorsal profile a flattened arc, ventral profile a little more convex, particularly so in females. Mouth strongly oblique, with projecting chin, its posterior angle beneath front margin of eye. The small, weak teeth are in a double row at the front of each jaw; elsewhere there is a complete outer row and a partial inner row of much smaller teeth.

The ctenactinium is very slender, curved, and either dextral or sinistral, its tip resting on median part of underside of head, immediately below eyes. It has probably not reached its maximum development in any of the specimens. Tip of pulvinular appendage slightly bifid. Priapial fringe well developed.

Holotype, Stanford 23637, a male, 23 mm long, and 57 paratypes, Stanford 36538: 26 females, 14 to 23 mm, and 31 males, 15 to 24 mm long; from a mangrove swamp beside the Fishery Experiment Station at Cagayan de Misamis, Oriental Misamis Province, Mindanao, P. I.; August 20, 1940; collected by the author. Females 21 and 22 mm in length contained eggs.

I place here also a series from a nipa swamp at Dumaguete, Oriental Negros, which I collected in 1933, and called *N. amaricola*, but which are decidedly not that species. They are close to *N. coronensis*, but the opercles are naked. They have 28 to 30 scales in a lateral series, and 16 to 18 predorsal scales; the anal is II,11 to 13; gill-rakers 2+12. Forty-eight females are 15 to 25 mm, 47 males are 14 to 22 mm, and 31 juveniles nine to 13 mm in length.

Another lot from Old Ayukitan, a village a few kilometers north of Dumaguete, agrees with *N. villadolidi* as well as can be made out from the specimens, which are not in first-class condition; only one is mature. The only difference observed was the pectoral, I,9. From a nipa swamp I took five females, 15 to 18 mm, 18 males, 16 to 23 mm, and eight juveniles, nine to 13 mm in length.

Named for my esteemed friend and associate of many years, Dr. D. D. Villadolid, chief of the Philippine Bureau of Fisheries.

SANDAKANUS, new subgenus

This section is characterized by the presence of two or three large scales n each opercle. The fishes are among the smallest and most delicate of the family. hey are all very slender, fragile, transparent fishes of salt and brackish water; ome of them enter fresh water where springs or brooks flow into mangrove swamps r brackish creeks. They are among the most inconspicuous of fishes; their presence r existence was unknown to the Dyaks and Filipinos living where these fishes swarm n vast numbers. Not until I called the attention of the natives to them did they bserve them.

Genotype *Neostethus borneensis* Herre.

Neostethus (Sandakanus) borneensis (Herre)

Neostethus borneensis Herre, 1939, Proc. Biol. Soc. Washington, vol. 52, p. 143; 1940, Bull. Raffles Mus., no. 16, p. 14, pls. 10,11.

The outstanding character of this delicate, transparent little fish is the presence of three large scales on each opercle.

First dorsal II (or I?); second dorsal I,4; anal II,13 or 12; pectoral I,8; scales in a lateral series, males, 26 or 25, plus one on caudal base, females 26 or 27, plus one on caudal base; transverse scales, from second dorsal origin to anal, 3 or 7.5; predorsal scales 15 or 16, but females may have up to 18; first dorsal two scales before second. In the young, a thick ring forms about the anus and then divides posteriorly; the free ends lengthen until vestigial ventral rays develop, after which the structure gradually disappears. The comb or fringe of cilia on the hind end of the priapium is little evident; it is so delicate that it is easily destroyed, so that on many specimens it does not show at all. The teeth seem to be in but one row on each jaw, and are relatively large and strong.

The depth is so variable as to be a character of minor importance; this is probably true of other species as well. Mature males, 12 to 18 mm long, have depth 4 to 4.35, head 4.4 to 4.9 in length; but a male 21.5 mm long had depth 5.8 in length. Females, 13 to 16 mm long, had depth 3.75 to 4.3, and head 3.9 to 4.4 in length; but a female 24.5 mm long had the depth 5.25. In males, eye 2.65 to 2.75, in females, 3 in head.

Sexually mature or nearly mature males are from 12 to 21.5 mm in length; immature males from 11 to 16 mm. One of 11 mm had the priapium well advanced, while on others of 16 mm it had not yet started to grow. Females can often be detected when 12 to 13 mm long.

From a brook and swamp draining into the Kabili River, British North Borneo, were taken 115 males, from 11 to 21.5 mm in length, and 31 females, 13 to 24.5 mm in length; nine others, from 11 to 12 mm, and of undetermined sex, taken with the above, had more or less evident vestigial ventrals. (Holotype: Stanford 33018; paratypes: Stanford 33022; January, 1937.)

From the Segaliud River, British North Borneo, were collected a male, 16 mm long, a female of 12 mm, and seven others, 10 to 15 mm long, including one of 11 mm with ventral fins. (Paratypes: Stanford 33020; February, 1937.)

In life this fish is so nearly colorless as to be invisible except for the pale golden eyes, and a tiny spot of the same color, the peritoneum, visible only when the fish exposes its side. It is abundant in the sheltered inter-island salt-

water canals and inlets of Sandakan Bay, and in all its tributaries and adjacent swamps of brackish water, up to where the water is fresh part or all the time.

Neostethus (Sandakanus) coronensis, new species

First dorsal II or I; second dorsal I,5 or 4; anal I,10 or 12, or II,11 or 12; pectoral I,9; scales in lateral series 25 to 27, sometimes one more on caudal base; transverse scales 6; predorsal scales 16 to 18, not extending on top of head; two large opercular scales. First dorsal two scales before second dorsal, opposite base of last, or next to last, anal ray in males; over base of last anal ray, or a little behind, in females. The first dorsal is often difficult to see, and often lost when scales drop off. Gill-rakers 1+10 or 11.

The depth, caudal length, and head length are equal or nearly so in mature adults; in females, 4.25 to 4.5 in length; in males, 5, but in mature males, depth and caudal may be appreciably more than head. Eye, in females, 2.66 to 2.85, snout 4 to 5, pointed, slender pectoral 1.3 to 1.4, second dorsal height 1.5 to 1.6, anal height 1.5 to 1.9 in head; least depth caudal peduncle 1.85 to 2 in its own length. Eye, in males, 2.33 to 2.5, snout 4.3 to 4.4, second dorsal height 1.75, height of anal 1.4 in head; pectoral equal to, or 1.25 in head; least depth caudal peduncle 1.4 in its own length.

The body is slender and greatly compressed, with deciduous scales, and slender, elongate fins that are readily broken, so that fin measurements are apt to be uncertain. Mouth nearly vertical, chin projecting, maxillary extending beneath front rim of eye in females, but scarcely reaching it in males. The curved, delicate teeth are proportionately smaller than in others of this group, and seem to be in a single row in each jaw.

Males have the priapium attached some distance to left or right of median line, and folded to other side except when used in fertilization. The strongly curved ctenactinium arises from posterior part of priapium; its tip or upper part rests in a groove under the chin, and may continue beyond and upward; sometimes it is in a perforation instead of a groove. The basal half may have a narrow wing, or membranous margin, on one or both sides; the tip is more or less slightly swollen and rounded, or knob-like. On the smooth, rounded outer side of the priapium are three diverging cartilaginous stays, as in *Neostethus borneensis* (Herre, Bull. Raffles Mus., 1940, no. 16, pl. 10). The comb-like fringe on the hind end of the priapium is poorly developed, and very readily destroyed, so that it is rarely seen, and then but two or three rays may be visible. As in the closely related species, *N. amaricola* and *N. borneensis*, the tiny, hook-like, pointed pulvinular spine, or exposed tip of the infrasulcar bone, is behind and concealed by the ctenactinial base; it can only be seen by lifting the ctenactinium so as to extend the priapium fully, and often does not show then. The ovoid, somewhat cartilaginous pulvinular appendage is attached by a short pedicel to the aproctal side of the anterior part of the priapium, its margin free, its surface concave, its posterior end somewhat double-pointed. The anal and genital openings of females are rather far apart, the former in a sort of ill-defined groove, the latter in a depression on the "neck." As in other species of the genus, individuals vary greatly in development; some males 14 mm long may be fully mature, while others of 16 mm may have the ctenactinium scarcely started.

In life, this fish is almost colorless and very difficult to see. In preservative, the eyes are black, and the body grayish to whitish, with black or dusky dots and specks, usually arranged as follows: a patch between and behind eyes, one

snout, and one on chin; a row along dorsal median line, the dorsal scales usu-
y margined with dots; a black line from upper angle of pectoral to middle of
dal base; a black line and row of dots above anal base, continued back along
lian ventral line to caudal base; a patch on pectoral base. Some, particularly
nales, have a patch on the cheeks. Urogenital area of females marked by parallel
V-shaped rows of dots. Males have the priapium more or less heavily pigmented,
pecially on sides and on inner and posterior surfaces of its rounded free end.
is colorless.

Holotype, Stanford 36542, a male, 18 mm long; and 89 paratypes, Stanford
543: 40 females, 13 to 19 mm, 40 males, 13 to 18 mm, and nine juveniles, nine to
mm in length; collected in salt, brackish, and fresh water, from a mangrove
amp, and from the mouth of a tributary rill, near the dock at Coron, Busuanga,
I., June 28, 1940, by the author.

Neostethus (Sandakanus) panayensis, new species

First dorsal I; second dorsal II, or I,5 or 6; anal II,12 or 13; pectoral
10; scales in lateral series 28 or 29, rarely 30, plus one on caudal base; trans-
rse scales 6; predorsal scales 19 to 23, extending to top of head above opercles,
d just behind eyes; opercular scales two; first dorsal two scales before the
cond. Jaws each with a single row of stout, curved teeth. Gill-rakers 2+15.

Holotype, Stanford 36539, a male, 19 mm in length, and 20 paratypes, Stan-
rd 36940: 16 females, 18 to 24 mm, and four males, 15 to 18.5 mm in length; from
nipa swamp, near Capiz, Panay, August 3, 1940; and 23 paratypes, Stanford 36541:
females, 21 to 24 mm, and six males, 17 to 19 mm in length; from a salt-water
dal brook which at low tide was merely a series of stagnant pools among nipa
lms, at Estancia, Panay, P. I., July 27, 1940; collected by the author.

Of the first series, only the largest male (the holotype) was mature, but
st of the females were fully adult; of the second series, none of the males were
ture, although one was almost. One of 18 mm had only a tiny hump to indicate the
ture priapium. In both series, the tumid opening of the oviduct was conspicuous
most of the females. The mature male holotype had the ctenactinium resting be-
nd the chin, well in advance of the eyes, and not piercing the tissue. No mem-
anous keel or margin on the ctenactinium; its tip not swollen to form a knob.
e well-developed and rather conspicuous pulvinular spine has a hooked tip, turned
ward. No priapial fringe could be detected, but would probably be seen on large
ture males.

Neostethus (Sandakanus) zamboangae, new species

First dorsal II or I; second dorsal I,4 or 5; anal II,13 to 15; pectoral
8; scales in lateral series 29 to 32, plus one or two on caudal base; transverse
eries 7; predorsal scales 16 or 17, rarely up to 19; opercular scales 2 (some-
mes one?); first dorsal is three or four scales from second dorsal, usually the
urth; scales absent from head, except on opercle, not extending forward beyond
ectoral base. A single row of stout curved teeth in each jaw. Gill-rakers 1+12.
riapial fringe well developed, its parts sometimes coalesced so that it is like a
in or keel. The strongly and angularly bowed ctenactinium rests below eyes and
hind chin, its tip bent forward at right angles; the pulvinular spine is very
all, inconspicuous, with a tiny hooked tip.

This species is more heavily pigmented than most members of the genus. preservative, all scales on back and sides are margined with dark red-brown dot the back from snout-tip to caudal is heavily dotted with black, and the top of t head is mostly black; a black line runs from the opercular angle to middle of ca dal base; a black line on anal base, continuing on median ventral line to cauda and a second black line above anal base, continued on side to caudal as a row dusky dots; a black line on middle of base of abdominal keel, often connected dots with anal line; sides of head dotted with black or dark brown; pectoral ba and axil with blotch of black or dark brown dots. Males have priapium more or le black-dotted, its rounded posterior with a blackish spot on each side, or its sid and inner surface entirely covered with blackish dots. Females have a black pat along the urogenital region.

Holotype, Stanford 36544, a male, 23 mm in length, and 224 paratypes, Stan ford 36545: 64 females, 15 to 23 mm, 85 males, 15 to 24 mm, 75 juveniles, nine t 16 mm in length, either too young or too immature to be certain of their sex; fro salt-water puddles about the bases of nipa palms, near the Fishery Station at Zam boanga, Mindanao, P. I.; September 6, 1940; collected by the author.

Many specimens from 14 to 17 mm in length have vestigial but easily recog nizable ventral fins. Males of 17 mm may have ventral fins, and a well-define "neck," but no priapial development. Other males of the same length may have th priapium in an advanced stage of development. Some females of 15 mm have alread lost the ventral fins. The probabilities are that most of those with ventral fins and most of those not listed as to sex, are juvenile males.

CTENOPHALLUS Herre

Ctenophallus Herre, 1939, Proc. Biol. Soc. Washington, vol. 52, Oct. 11, p. 144

This genus is separated from other Phallostethids by the presence of a dens fringe along both margins of the open groove on the priapium. In other respects i is close to *Neostethus*. The free end of the priapium has a comb-like fringe. Th margin of the small pulvinular appendage is free. The ctenactinium is regularl curved. According to Aurich's figure, the pulvinular spine is bent in a right an gle. The nape and opercles are naked, but Aurich says there are about three smal scales on top of the head.

Genotype *Solenophallus ctenophorus* Aurich.

Ctenophallus ctenophorus (Aurich)

Solenophallus ctenophorus Aurich, 1937, Internat. Rev. Hydrobiol. u. Hydrogr., vol. 34, p. 272, fig. 1b.
Ctenophallus ctenophorus Herre, 1939, Proc. Biol. Soc. Washington, vol. 52, p. 144.

First dorsal II; second dorsal I,4 to 6; anal I,13 to 16, according to Aur ich, but probably II,12 to 15; pectoral I,9 or 10; scales in lateral series 31 to 33; in transverse series 6; predorsal scales 19 to 21. Gill-rakers 2+13.

Females have depth 5.8 to 6.3, head 5 to 5.2 in length; males have depth 5.8 to 6, head 5.7 to 6 in length. Eye 2.7 to 3.3 in head. Mouth vertical, teeth in one or two rows. Body laterally compressed, back rounded in a half cylinder. Scales regularly arranged. Length of pulvinular appendage equal to an eye diameter. On two

ng females were a pair of rudimentary fused ventral fins, placed asymmetrically one side of the oviduct papilla. The posterior third of the caudal is forked.

The above is taken from Aurich's unsatisfactory description. He says his pimens were taken by Woltereck from a tributary of Laguna de Bay, Luzon, P. I.; tells nothing of the number of specimens or their measurements, except that es are 24 mm and females 20 mm long. Evidently he had no fully mature females. this indefinite locality is correct, the species must have a very restricted tribution. I have examined the fishes of at least a dozen tributaries of Laguna Bay, on the south, east, and north, and have seen nothing like it; nor have my leagues of the Philippine Bureau of Fisheries been able to find it thus far in lake tributaries. *Gulaphallus mirabilis* occurs in most of them. Until this h is rediscovered and fully described its status must remain vague.

PLECTROSTETHUS Myers

ctrostethus Myers, 1935, Proc. Biol. Soc. Washington, vol. 48, Feb. 6, p. 5.

No toxactinium. A single smooth ctenactinium, not greatly curved, with a ad membranous margin along the lower side of its proximal half. At its base, folded ctenactinium covers a flat, fleshy process, armed on its upper and pos- ior borders by a row of nine or 10 short, sharp, recurved spines; on its an- ior border the process bears two longer spines, directed forward. An oval pul- ular appendage, smaller than the eye, and free around its entire margin, lies t posterior to the prominent keel of the axial bone.

Genotype *Plectrostethus palawanensis* Myers, the only included species.

Plectrostethus palawanensis Myers

ctrostethus palawanensis Myers, 1935, Proc. Biol. Soc. Washington, vol. 48, Feb. , p. 5.

First dorsal II; second dorsal I,4; anal II,12 to 14; scales 30 to 32 in a gitudinal, and 7 in a transverse series. Nape and opercles naked. Body very nder, depth 7.66, head 5.75 in length. Least depth, caudal peduncle, 11.5; dis- ce from snout-tip to anal origin 1.87, from second dorsal origin to caudal base 3 in length. The weak lower jaw partly included within the upper. The recurved th in a single row in each jaw.

Only known from 12 specimens in the U.S. National Museum, obtained at the th of the Caiholo River, Ulugan Bay, west coast of Palawan, Philippine Islands. e only lengths given are those of the male holotype, 23 mm, and female allotype, .5 mm.

I have seen no specimens, the above being compiled from Myers.

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